

WHAT IS CLAIMED IS:

1. A rotary electric machine comprising:

a frame having an air opening through which air flows;

a stator core disposed to be supported in the frame,  
the stator core having a plurality of slots;

a stator winding including a plurality of conductor  
segments each of which is formed into an approximate U-shape  
having a pair of leg parts, the stator winding being inserted  
into the stator core through the slots to have both coil ends  
protruding from both ends of the stator core, respectively;

a rotor disposed opposite to the stator core to be  
rotatable;

a cooling fan for blowing air toward the both coil ends  
of the stator winding; and

an elastic member disposed between the stator core and  
the frame to be inserted therebetween, wherein:

the conductor segments are inserted into the slots of  
the stator core in such a manner that, the leg parts of each  
conductor segment penetrate through the slots from one end of  
the stator core to the other end thereof, and are connected at  
top ends; and

the conductor segments are arranged to have a  
predetermined clearance between adjacent two thereof at the both  
coil ends of the stator winding, into which air blown by the  
cooling fan flows.

2. The rotary electric machine according to claim 1,

wherein:

the elastic member has an outer peripheral surface press-contacting an inner peripheral surface of the frame, and an inner peripheral surface press-contacting an entire outer peripheral surface of the stator core.

3. The rotary electric machine according to claim 1, wherein:

the stator core is disposed around the rotor to have a cylindrical outer surface; and

the elastic member is made of a rubber, and is formed into a cylindrical shape.

4. The rotary electric machine according to claim 1, wherein the elastic member has a cylindrical elastic portion made of rubber, a first cylindrical metal portion integrated with an inner surface of the cylindrical elastic portion, and a second cylindrical metal portion integrated with an outer surface of the cylindrical elastic portion.

5. The rotary electric machine according to claim 1, wherein:

the frame includes first and second frame parts separated in an axial direction of the rotor, the first and second frame parts being disposed to be fastened in the axial direction while press-contacting outer peripheral edge parts of the stator core through the elastic member.

6. The rotary electric machine according to claim 1, wherein:

the frame includes first and second frame parts separated in an axial direction of the rotor;

the elastic member includes first and second ring elastic parts each of which has an approximate L-shaped cross-section in the axial direction;

the stator core has first and second outer peripheral edge parts in the axial direction;

the first ring elastic part is inserted between both surfaces of the first outer peripheral edge part of the stator core and both surfaces of an inner corner part of the first frame part; and

the second ring elastic part is inserted between both surfaces of the second outer peripheral edge part and both surfaces of an inner corner part of the second frame part.

7. The rotary electric machine according to claim 6, wherein:

each of the first and second ring elastic parts includes a ring elastic portion formed of an elastic material to have an approximate L-shaped cross-section, an inner ring portion formed of a metal to have an approximate L-shaped cross-section corresponding to an inner side surface of the ring elastic portion, and an outer ring portion formed of a metal to have an approximate L-shaped cross-section corresponding to an outer side surface of the ring elastic portion; and

the elastic portion, the inner ring portion and the outer ring portion are integrated.

8. The rotary electric machine according to claim 1, wherein:

the frame has first and second frame parts separated in an axial direction of the rotor;

the elastic member includes first and second ring elastic parts each of which has an approximate L-shaped cross-section in the axial direction and in a radial inner side;

the stator core has first and second cylindrical step parts recessed from outer peripheral edge parts in the axial direction and in a radial inner side;

the first ring elastic part is inserted between both surfaces of the first step part and an inner peripheral end part of the first frame part; and

the second ring elastic part is inserted between both surfaces of the second step part and an inner peripheral end part of the second frame part.

9. The rotary electric machine according to claim 8, wherein:

each of the first and second ring elastic parts includes a ring elastic portion formed of an elastic material to have an approximate L-shaped cross-section, an inner ring portion formed of a metal to have an approximate L-shaped cross-section corresponding to an inner side surface of the ring elastic

portion, and an outer ring portion formed of a metal to have an approximate L-shaped cross-section corresponding to an outer side surface of the ring elastic portion; and

the elastic portion, the inner ring portion and the outer ring portion are integrated.

10. The rotary electric machine according to claim 1, wherein:

the frame has first and second frame parts separated in an axial direction of the rotor;

the elastic member includes first and second elastic parts each of which has an approximate L-shaped cross-section in the axial direction;

the stator core has first and second outer peripheral edge parts in the axial direction;

the first elastic part is inserted between both surfaces of the first outer peripheral edge part of the stator core and both surfaces of an inner peripheral end part of the first frame part, and is disposed to be separated into plural elastic pieces at predetermined positions in a circumferential direction, each of the elastic pieces having an approximate circular arc shape; and

the second elastic part is inserted between both surfaces of the second outer peripheral edge part of the stator core and both surfaces of an inner peripheral end part of the second frame part, and is disposed to be separated into plural elastic pieces at predetermined positions in a circumferential

direction, each of the elastic pieces having an approximate circular arc shape.

11. The rotary electric machine according to claim 1, wherein:

the frame has first and second frame parts separated in an axial direction of the rotor;

the stator core is disposed around the rotor to have a cylindrical outer peripheral surface, and both end surfaces in an axial direction of the rotor; and

a middle part of the outer peripheral surface of the stator core in the axial direction is disposed to expose to an outside.

12. The rotary electric machine according to claim 1, wherein:

the frame has first and second frame parts separated in an axial direction of the rotor;

the first frame part has an end surface opposite to the second frame part in the axial direction;

the second frame part has an end surface opposite to the first frame part in the axial direction; and

the end surface of the first frame part contacts the end surface of the second frame part at a radial outside of the stator core.

13. The rotary electric machine according to claim 1,

wherein:

an inner peripheral surface of the frame has plural frame slots extending in an axial direction of the rotor at positions opposite to the stator core;

the elastic member includes plural elastic parts which are inserted into the frame slots to have elastic surfaces corresponding to the inner peripheral surface of the frame.

14. The rotary electric machine according to claim 1, wherein:

the frame is disposed to define a liquid fluid passage through which a cooling fluid for cooling the stator core flows; and

the elastic member is disposed between the frame and the stator core to directly contact the cooling fluid.

15. A rotary electric machine comprising:

a frame;

a stator core disposed to be supported in the frame, the stator core having a plurality of slots;

a stator winding being inserted into the stator core through the slots; and

an elastic member disposed between the stator core and the frame to be inserted therebetween,

wherein the frame is disposed to define a liquid fluid passage through which a cooling fluid for cooling the stator core flows at a position proximate to the stator core.

16. The rotary electric machine according to claim 15, wherein the elastic member is disposed between the frame and the stator core to have a part directly contacting the cooling fluid.

17. The rotary electric machine according to claim 15, wherein:

the stator winding includes a plurality of conductor segments each of which is formed into an approximate U-shape having a pair of leg parts;

the stator winding is inserted into the stator core through the slots to have both coil ends protruding from both ends of the stator core, respectively;

the leg parts of the conductor segments penetrate through the slots from one end of the stator core to the other end thereof, and are connected at top ends; and

the conductor segments are arranged to have a predetermined clearance between adjacent two thereof at the both coil ends of the stator winding.